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Title: Embroidery Machine with a Cap Bill Support Device

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EMBROIDERY MACHINE WITH A CAP BILL SUPPORT DEVICE

FIELD OF THE INVENTION

The present invention generally relates to embroidery equipment. More specifically, the present invention relates to devices used in the embroidery of headgear and other products that have a protrusion such as a bill.

BACKGROUND OF THE INVENTION

As technology advances, people desire more elaborate and far-reaching methods of identification as individuals or to identify with a particular group. Companies desiring to create employee unity or brand awareness provide their logo on clothing. People identify with sports teams, schools or other institutions as a means of support or identification with that group. In each of these, the use of embroidery is much superior in durability and long-term appearance than silk screening or other printing processes. As such, the embroidery of clothing and other cloth materials is a thriving industry.

One such embroidered product that stands out is the cap. A billed cap or "baseball" cap is commonly worn by everyone from athletes to fans and even someone that just wants to keep the sun out of their eyes while mowing the lawn. A logo on a cap is extremely valuable regarding visibility of that logo in that it is the closest to eye level of any worn item as the wearer is viewed by someone else. The problem with embroidery on the front of the billed cap is the bill. This protrusion extends several inches beyond the front of the cap and immediately adjacent to the area that is embroidered. As such, the bill is commonly in the way of the embroidery machine. If the cap is bumped during the embroidery process the registration of one color thread

relative to the next color thread used would be lost and the cap would be scrapped. This increased scrap rate greatly increases the cost of production. Few attempts have been made to correct this problem. One attempt ahs been by use of a rubbing plate that is a stationary plate mounted on the machine. As the cap is rotated and moved in the embroidery machine to embroider the logo or other art, this bill is also rotated side-to-side and front to back. The rubbing plate latterly rubs against the bill of the cap as it moves to keep it clear from the area that is being embroidered. As one can imagine, this "beating " of the bill against the rubbing plate only increases the chances of knocking the cap loose, thus losing registration and scrapping the item.

SUMMARY OF THE INVENTION

In one aspect, the invention features an embroidery machine with a cap bill support device, the machine including a hat hoop base frame. The device includes bill hook capable of physical attachment to the cap bill and a base support secured to the hat hoop base frame. The base frame receives the bill hook, thereby offering removable support of the cap bill when positioned adjacent to the hat hoop base frame.

The machine may also include a hook that is pivotally mounted to the base support. The hook may include a substantially "L" shaped arm including a foot, thereby enabling attachment to the cap bill. The hook may also include a clamp that is releaseably secured to the cap bill. The arm of the hook is received by the base support and optimally received by a lip hook on the base support. The support device may comprise a substantially flat plate including at least one mounting hole, thereby enabling mounting of the substantially flat plate to a peripheral flange on

the hat hoop base frame. Alternatively, the arm may be received by a lip hook on a visor bracket, which is mounted to the hat hoop base frame.

In another aspect, the invention includes a method of providing a method of supporting a cap bill to facilitate the embroidery of a cap and including the steps of providing a device as previously described and positioning a cap in the embroidery device adjacent to the hat hoop base frame. The user displaces a portion of the cap bill toward the base support and attaches the bill hook to the cap bill with the bill hook supported by the base support. This attachment maintains the cap bill in a displaced orientation to facilitate embroidery of the cap.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects of this invention, the various features thereof, as well as the invention itself, may be more fully understood from the following description, when read together with the accompanying drawings, described:

Fig. 1 is an isometric exploded view of a portion of an embroidery machine incorporating a bill support device, the device produced in accordance with the present invention.

Fig. 2 is an isometric exploded view of a hat hoop base frame and a lid frame of an embroidery machine incorporating a bill support device, the device produced in accordance with the present invention.

Fig. 3 is an alternative view of the exploded view as shown in Fig. 2, showing a bill support device, the device produced in accordance with the present invention.

Fig. 4 is a side view of a hat hoop base frame and lid frame with a cap positioned therein with the bill of the cap being secured by a bill support device, the device produced in accordance with the present invention.

Fig. 5 is a cut away of an upper portion of a hat hoop base frame with a bill support device in an exploded form, the device produced in accordance with the present invention.

Fig. 6 is a cut away of an upper portion of a hat hoop base frame with a bill support device shown as an element of the visor bracket, the device produced in accordance with a form of the present invention.

Fig. 7 is a cut away of an upper portion of a hat hoop base frame with a bill support device in an exploded form with an alternative bill hook, the device produced in accordance with a form of the present invention.

For the most part, and as will be apparent when referring to the figures, when an item is used unchanged in more than one figure, it is identified by the same alphanumeric reference indicator in all figures.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is an embroidery machine with a cap bill support device. Some of the components of the machine **10**, as they relate to the novelty of the invention, are shown in **Fig. 1**. The rack support rail **12** is a longitudinal rail that offers a means of support for one, or usually multiple heads (not shown) that perform the actual sewing of the embroidery process. In addition, for each head, there is a mechanism to hold or secure and move the article being embroidered. For caps **14** and other items of similar shape, a hat rack **16** is the base of that holding mechanism. The hat rack **16** supports the cap **14** and moves relative to the rail **12** to enable a design to be embroidered onto the article. A key element regarding the novelty of this invention is the hat hoop base frame **18**. This item directly holds the cap **14** and is secured thereon by the lid frame **20**. A pair of base frame shafts **22** extend from the hat hoop base frame

18 and provide support for the lid frame 20 as well as help support the back side of the hat portion 24 of the cap 14. A pair of clips 26 are typically used to assist in holding the cap 14 secured to the hat hoop base frame 18 by way of clamping the back of the hat 24 to the base frame shafts 22.

When the cap 14 is fully mounted onto the hat hoop base frame 18, it is critically important that the cap 14 does not move relative to the hat hoop base frame 18 as the hat rack 16 rotates and moves the assembly of the hat hoop base frame 18 and cap 14. This movement is necessary as this provides the ability for the logo or design to be applied by the head, which is substantially stationary relative to the rack support rail 12. If there is any slippage of the cap 14 on the hat hoop base frame 18, registration will be compromised and the embroidered design will be flawed. The part must then be scrapped, thus adding greatly to the cost of the embroidery process. To complicate matters, the cap 14 includes a bill 28 that extends away from the hat portion 24, but is immediately adjacent to the embroidery area 30. As such, during the embroidery process, this cantilevered structure of the bill 28 is whipping back and forth, potentially coming into contact with the head or other structure of the machine 10. One severe hit and the cap 14 can be dislodged enough to damage the embroidery in process.

To overcome this problem the applicant has devised a convenient mechanism that hooks the bill 28 back away from the embroidery area 30, to make room for the head to work and secures the bill 28 to a portion of the hat hoop base frame 18. This moves with the cap 14 as it moves during the embroidery process, greatly reducing the possibility of inadvertent movement of the cap 14.

What is shown in **Fig. 2** is an enlarged view of the hat hoop base frame 18, cap 14 and lid

frame **20**. The assembly of the cap **14** on the hat hoop base frame **18** includes the bill **28** being received by the bill slot **32** in the lid frame **20**. The lid frame **20** then rotates over the cap **14** and is clamped into place on the hat hoop base frame **18** by use of the pinch lock **32**. The novelty of the assembly is due to the base support **34** and the bill hook **36**. In this form of the invention the base support is comprised of a substantially flat plate **38** including a lip hook **40**. Holes **42** are positioned in the flat plate **38** to allow the base support **34** to be mounted to the hat hoop base frame **18**. As shown here, the optimal mounting is to a peripheral flange **44** on the hat hoop base frame **18**. On the backside of the flange **44** is the visor bracket **46**, which is typically mounted to the flange **44** by a pair of screws **48**. These same screws **48** can be used to secure the base support **34** and the visor bracket **46** to the flange **44** of the hat hoop base frame **18**.

The bill hook **36** is shown here to be in the form of a clip **26** as is also used to secure the hat portion to the base frame shafts **22**. The clamping portion of the clamp acts as a foot to grab the distal end of the bill **28**. The other critical aspect of the bill hook **36** is the arm, in this case that being one of the clamp arms **50**. The use of these components is better illustrated in **Fig. 3**.

Fig. 3 shows the same elements of **Fig. 2** only from the opposite direction. The base support **34** is fastened to the hat hoop base frame **18** by way of the peripheral flange **44**. The lip hook **40** extends away from the cap **14**. As the cap **14** is received on the hat hoop base frame **18** and fastened down by the lid frame **20**, the clamp arm **50** can be received by the lip hook **40**. This is shown by the arrow **52**. In order for this to be accomplished, the cap bill 28 must be bent toward the flange **44**. This moves the cap bill **28** away from the hat portion **24**, which is to be embroidered.

A side view of the cap **14** assembled into the hat hoop base frame **18** is shown in **Fig. 4**.

The cap **14** sits over a portion of the hat hoop base frame **18** and the lid frame **20** is clamped into place by the pinch lock **32**, the bill **28** extending through the bill slot **32**. The bill **28** is secured by the clamp **54** of the bill hook **36** and the arm of the bill hook **36**, in the form of one of the clamp arms **50**. The lower arm **50** is received by the lip hook **40** of the base support **34**. This flexes the bill **28** toward the flange **44** and away from the embroidery area 30 of the cap **14**.

Specifics of the area of the hat hoop base frame **18** near the base support **34** in a variety of forms is shown in Fig. 5; Fig. 6 & Fig. 7. In **Fig. 5**, the elements as previously disclosed are shown in an exploded isometric view. The base support **34** is comprised of a substantially flat portion **38** and a lip hook **40**. Holes **42** allow the screws **48** to be fastened through the flange **44** while also supporting the visor bracket **46**. The bill hook **36** is comprised of a clamp **54** with clamp arms **50**, one of which is received by the lip hook **40** to hold a cap bill in place.

A variation is shown in **Fig. 6** in which the base support **34** is comprised of a modified visor bracket **46**. The modification includes the placement of a lip hook **40** directly on the visor support **46**, the hook **40** preferably located near the flange **44** of the hat hoop base frame **18** when assembled thereon. The bill hook **36** can take the similar form of the clamp **54** as shown here. As before, the screws **48** are used to fasten the base support **34** to the hat hoop base frame **18** and in this case this also includes the visor bracket **46** in that they are the same part. Another alternative to this, which is not shown is a modification of the flange **44** to include a lip hook **40** as part thereof. By fastening the base support **34** to the flange **44**, it is understood that another variation would be in providing the lip hook as part of the flange **44**, thereby making the flange **44** directly part of the base support **34**.

Another variation is shown in **Fig. 7** wherein the bill hook **36** is comprised of a

substantially "L" shaped arm **56** including a foot **58** enabling attachment to the cap bill. This arm **56** can be a single arm or a double arm, as shown here, and it can be pivotally mounted to the base support **34** by way of a pivot joint **60**. Alternatively this pivot joint **60** can be a lip hook as previously disclosed, and the arm **56** can be releaseably mounted to the base support **34**, as previously described with the clamp. The specific structure of the leg(s) **56** can vary but a simple hook of the foot **58** can be adequate to hook around the cap bill and hold it into position as previously disclosed.